

# Haemodialysis Related Ascites

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- Nephrogenic ascites has been known by several names such as nephrogenous ascites, hemodialysis associated ascites, dialysis ascites, idiopathic dialysis ascites(IDA),or ascites associated with ESRD.
- *Nephrogenic* ascites is preferred, because the onset of ascites may occur before the initiation of dialysis and cases have been reported in patients with failing kidney transplant.

- The term *nephrogenic ascites* was coined to describe a syndrome associated with refractory ascites occurring in patients with end-stage renal disease in whom infectious, malignant, hepatic, and cardiac causes have been excluded.

- Incidence of **nephrogenic ascites** seems to decrease over time, because most cases were reported more than 15 years ago.
- Technical improvements in HD, with better control of fluid balance, as well as progress in nutritional and psychologic treatment of HD patients, and use of more biocompatible membrane have been pointed out as the main reasons for this decreased incidence.

- Nephrogenic ascites is characterized by a marked center-to-center variability in incidence (0.7 to 20%), a wide age range of onset ( 1 1 to 7 1 yr, mean 42 yr), and a male sex (male:female = 2: 1 ), but no race predilection (white:black = 1 : 1 ).

- Chronic ambulatory peritoneal dialysis preceded hemodialysis in 69% of the patients.
- *Ascites accumulation can occur as early* as 18 months before or as late as 69 months after the initiation of hemodialysis.
- Approximately 70% of reported cases in the past occurred in association with the glomerulonephritides and hypertensive renal disease.

# Diagnosis And Clinical Course

- The diagnosis is made by exclusion, after ruling out other causes such as infection, liver disease, and heart failure.
- Most of the reported patients presented signs of persistent fluid overload, cachexia, or low serum albumin levels.
- The prognosis for nephrogenic ascites is very poor.
- The average survival ranges from 7 to 10.7 months, with 44% dying within 15 months of diagnosis.

- Patients suffering from IDA had a characteristic clinical profile, most showed a sustained fluid overload, with disproportionate interdialysis body weight increases and arterial hypertension; hypoproteinemia and malnutrition were frequent, and most of the cases had antecedents of peritoneal dialysis.



**TABLE 1. Diagnostic criteria and recommended evaluation for nephrogenic ascites**

Criteria	Recommended Evaluation
<p>History/Physical Signs</p> <ul style="list-style-type: none"> <li>Increasing abdominal girth</li> <li>Anorexia and early satiety</li> <li>Dialysis-associated hypotension</li> <li>Cachexia</li> <li>Massive ascites combined with minimal edema</li> </ul> <p>Ascitic Fluid Characteristics</p> <ul style="list-style-type: none"> <li>Straw color</li> <li>White blood cell count of 25 to 1,600/mm<sup>3</sup></li> <li>Serum-ascites gradient &lt;9 g/L (0.9 g/dL)</li> <li>Negative culture and cytologies</li> </ul> <p>No Evidence of:</p> <ul style="list-style-type: none"> <li>Portal hypertension</li> <li>Cardiac/pericardial disease</li> <li>Peritoneal infection or malignancy</li> <li>Pancreatic pseudocyst</li> <li>Inferior vena cava obstruction</li> <li>Budd-Chiari syndrome</li> <li>Urinary extravasation</li> <li>Hypothyroidism</li> </ul>	<p>History and physical examination</p> <p>General chemistries including BUN, creatinine, total protein, and albumin</p> <p>Paracentesis for complete blood cell count with differential, total albumin, amylase, culture, cytology, urea, protein, and creatinine</p> <p>Thyroid function tests, iron studies, parathyroid hormone level, peritoneoscopy with liver/peritoneal biopsy, abdominal computed tomography/magnetic resonance imaging, portal venous pressure measurement</p>

**TABLE 2. Possible pathogenetic processes of nephrogenic ascites**

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**Elevated Hepatic Venous Hydrostatic Pressure**

**Volume Overload**

**Increased Peritoneal Membrane Permeability**

**Secondary to**

**Uremic toxins**

**Prior exposure to dialysis solutions**

**Renin-angiotensin activation**

**Circulating immune complexes**

**Hemosiderosis**

**Impaired Lymphatic Drainage**

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- Other possible contributing causes of ascites in patients with ESRD include hypoproteinemia, secondary hyperparathyroidism-induced serositis, congestive heart failure, constrictive pericarditis, pancreatitis, and liver cirrhosis with portal hypertension.

- A role for CIC in altering peritoneal permeability has been suggested by the decrease in ascites in some patients after continuous ambulatory peritoneal dialysis (CAPD), a dialytic modality known to efficiently remove CIC .
- Hemosiderosis was reported in four patients with nephrogenic ascites. Ascites decreased in response to iv deferoxamine and recombinant human erythropoietin therapy, suggesting a role for iron deposition-induced alteration in peritoneal permeability

- Ascitic fluid had characteristics of exudate (total proteins, 4.7 g/dL), according to most previous reported cases of IDA. Initially oncotic pressure and total protein could be low.
- Histological examination of peritoneal tissue showed chronic inflammatory changes.
- IDA might be considered as a manifestation of uremic polyserositis, the peritoneal inflammatory changes could have a similar pathogenesis to those occurring in pericardial or pleural seroses in some HD patients, which cause the so-called dialysis-associated pericarditis or pleuritis, respectively.
- However, the precise cause and pathogenesis of such dialysis-related polyserositis remain uncertain.
- Normalization of renal function after the kidney graft, strengthens the relationship between uremia and ascites.

**TABLE 3. Therapeutic options for nephrogenic ascites**

Modality	Advantage	Disadvantage
Fluid and Salt Restriction With Intensified Hemodialysis With Ultrafiltration and/or Albumin Infusion	Decreases ascites	Limited by hypovolemia and hypotension
Hyperalimentation	Improves nutrition	Not proven to reduce ascites
Repeated Paracentesis	Reduces symptoms	Excessive protein loss
Reinfusion of Ultrafiltrated Ascites/Extracorporeal Ascites Dialysis	Conserves protein, reduces ascites, avoids dialysis-associated hypotension	Fever, peritoneal catheter malfunction
CAPD	Improved nutrition, reduces ascites	Self-limited early protein loss
Peritoneovenous Shunt	Reduces ascites, improves nutrition, prevents dialysis-associated hypotension	Shunt malfunction/infection
Kidney Transplant	Resolution of ascites	Recurrence after graft failure



- Treatment of patients with ascites, which includes paracentesis, fluid and sodium restriction, aggressive intradialytic ultrafiltration (UF), or additional isolated UF ‘conventional treatment’, has been successful in significantly decreasing ascites in fewer than 50% of patients.
- Nonresponders often do poorly, developing cachexia, malnutrition, and general discomfort, with progressive deterioration and death.

- A more aggressive approach to treatment, which includes peritoneal instillation of steroids ,reinfusion of ultrafiltrated ascites ,bilateral nephrectomy, peritoneal dialysis, renal transplantation,and continuous reinfusion of ascites directly into the venous system using a peritoneovenous shunt (PVS).
- Renal transplantation is considered the most effective. So far, all patients with IDA who have received a functioning kidney graft have shown a total resolution of ascites.



## **Idiopathic Dialysis Ascites in the Nineties: Resolution After Renal Transplantation**

Maria Melero, MD, Marina Rodriguez, MD, Alicia Araque, MD, Concepción Alamo, MD, Amado Andrés, MD, and Manuel Praga, MD

● The incidence of idiopathic dialysis ascites seems to have decreased since the introduction of more effective techniques for control of fluid overload and uremia in chronic hemodialysis patients. Most of the patients reported so far had some predisposing factor, such as malnutrition or sustained fluid overload. We report a case of idiopathic dialysis ascites in a young well-nourished woman with an excellent control of fluid overload and in whom biocompatible dialyzer membranes and volumetric controlled ultrafiltration had been used since her onset of chronic dialysis. Extensive studies excluded the existence of an underlying cause for ascites. Ascitic fluid had the characteristics of an exudate, and a peritoneal biopsy specimen showed chronic nonspecific inflammatory changes. Massive ascites persisted for 6 months, requiring repeated paracentesis, until the performance of a successful renal transplantation. Coinciding with the recovery of renal function, a dramatic disappearance of ascites was observed.

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**INDEX WORDS:** Idiopathic dialysis ascites; renal transplantation.

- Although the initial reports on the use of a PVS for the treatment of refractory ascites in hemodialysis patients were discouraging, subsequent reports describe significant relief of ascites after insertion of a PVS.

# Hemodynamic Effects of Peritoneovenous Shunts in Hemodialysis Patients With Ascites

Sheldon Greenberg, MD, Warren B. Shapiro, MD, and Jerome G. Porush, MD

● Ascites in hemodialysis patients has been reported in association with systemic diseases, such as cirrhosis or congestive heart failure, and as an idiopathic form. Regardless of the etiology, these patients often are refractory to treatment with intradialytic ultrafiltration because of recurrent hypotensive episodes. In this report we describe the hemodynamic effects of peritoneovenous shunts (PVSs) in three hemodialysis patients with ascites refractory to conventional treatment. One patient had idiopathic ascites and the other two had associated liver disease. Patients were monitored for lowest blood pressure, number of intradialytic hypotensive episodes, number of grams of albumin infused to treat hypotensive episodes, interdialytic weight gain, and hemodynamic stability (defined as the difference between the predialysis mean arterial pressure and the lowest intradialytic mean arterial pressure). In all three patients the hemodynamic parameters stabilized after PVS placement despite equal or greater ultrafiltration during dialysis (due to a significant increase in the lowest measured intradialytic blood pressure). The total number of hypotensive episodes decreased from 219 prior to PVS placement to zero after shunt placement. The need for albumin infusion during hemodialysis (for blood pressure support) decreased (significantly in two patients), as did the volume of ascites in all three patients. One patient required PVS replacement secondary to infection, which was the only complication. We believe that refractory ascites in end-stage renal disease patients can be successfully treated by placement of a PVS, which often results in relief of the ascites and significant improvement in intradialytic hemodynamic stability.

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INDEX WORDS: Ascites; hemodialysis; peritoneovenous shunts.

- Complications of shunt placement, seen in over one-half of the cases, include malfunction from occlusion or migration of the venous end out of the superior vena cava and infection.
- These complications require either minor revisions or removal of the shunt.
- Shunts remained functional for up to 18 months in one series (Denver) and for more than 3 yr in another (LeVeen). Thus, shunt placement should be seriously considered early in the treatment of such patients.

- CAPD is also effective in the treatment of ascites.
- The combination of routine daily exchanges and control of fluid and salt intake allows control of the ascites.
- The patients subjectively feel better, with improved caloric and protein intake and subsequent weight gain. Within 6 months of continued treatment, the amount of total protein excretion in the dialysis effluent decreases from 26.5 to 50 to 7.8 to 9.44 g/day, with a subsequent rise in the serum protein and albumin levels and the resolution of ascites.

- Other treatments attempted with only partial success that are no longer recommended Include the I.p. administration of steroids and bilateral nephrectomy .

- Although no prospective studies have been performed comparing various treatment modalities, on the basis of current data, CAPD, peritoneovenous shunt placement, and renal transplantation offer the best hope for an improvement in the quality of life and recovery.

Thank  
You